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Presented for filing is a new original patent application of:

Applicant:	JAY H. CONNELLY
Title:	BROADCASTING AND PROCESSING MULTIPLE DATA FORMATS

Enclosed are the following papers, including those required to receive a filing date under 37 CFR §1.53(b):

	Pages
Specification	12
Claims	8
Abstract	1
Declaration	1
Drawing(s)	6

Enclosures:

- Assignment cover sheet and an assignment, 2 pages, and a separate $40.00 fee.
- Postcard.

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Page 2

Basic filing fee	760.00
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Respectfully submitted,

Scott C. Harris
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Enclosures

APPLICATION

FOR

UNITED STATES LETTERS PATENT

TITLE: **BROADCASTING AND PROCESSING MULTIPLE DATA
                FORMATS**

APPLICANT: **JAY H. CONNELLY**

BROADCASTING AND PROCESSING MULTIPLE DATA FORMATS

Background of the Invention

5   This invention relates to broadcasting and processing data.

Some digital televisions use a viewer application to process data from an audio or video broadcast. The viewer application decodes and presents homogeneous data from different content providers for listening or viewing.

5   Recently, several new content formats have been developed for data broadcasts. These new contents combine video data and with other content data that enables interactive viewing. New types of software viewer applications process the new content formats.

10

Summary of the Invention

In a first aspect, the invention provides a method of broadcasting data. The method includes sending to a receiver scheduling information that includes a scheduled time and

15   broadcasting data at the scheduled time. The scheduling information identifies one or more viewer applications capable of processing the broadcast data.

In a second aspect, the invention provides a method of processing data. The method includes receiving scheduling

20   information that provides broadcast times for data broadcasts and information to identify viewer applications to process

the data broadcasts. The method also includes receiving data from one of the broadcasts at the scheduled broadcast time and processing the received data with a viewer application responsive to the scheduling information.

5   In a third aspect, the invention provides a method of processing data. The method includes receiving scheduling information that provides broadcast times for data broadcasts and information for identifying viewer applications for processing the broadcasts. The method also includes writing

10 the scheduling information to a scheduling table having entries indexed by scheduled broadcast times and channels.

In a fourth aspect, the invention provides a method of processing data. The method includes receiving data from a broadcast at a scheduled broadcast time and selecting a

15 viewer application from a table of available viewer applications to process the data. The method also includes processing the received data with the selected viewer application.

Other features and advantages of the invention will be

20 apparent from the following description and claims.

<u>Brief Description of the Drawings</u>

FIG. 1 illustrates a network for broadcasting data in accordance with an embodiment of the invention;

FIG. 2 illustrates a device for viewing data broadcast on the network of FIG. 1 in accordance with an embodiment of the invention;

FIG. 3 is a flow chart illustrating a method of

5 processing broadcasted data in accordance with an embodiment of the invention;

FIG. 4 shows a portion of an exemplary scheduling table in accordance with an embodiment of the invention;

FIG. 5 shows a portion of an exemplary viewer

10 application selection table in accordance with an embodiment of the invention; and

FIG. 6 is a flow chart illustrating a method of broadcasting data in accordance with an embodiment of the invention.

15

Detailed Description

FIG. 1 illustrates a network 10 for broadcasting data from transmitters 11-13 to receivers 15-18. The transmitters 11-13 dynamically change the content format of the data in

20 successive broadcasts. The receivers 15-18 dynamically adjust to process the different content formats differently.

Each receiver 15-18 includes a television with a programmable processor or a personal computer for presenting the broadcasts to viewers. The receivers 15-18 are

- 3 -

dynamically reprogrammable to process data from different
broadcasts differently.

   The transmitters 11-13 broadcast the data through a
transport medium 20, such as the Internet, i.e., in multicast
5 group broadcasting, a cable network, a wireless network, a
satellite network, an Advanced Television Systems Committee
(ATSC) network. The medium 20 has separate broadcast
channels on which different transmitters 11-13 may broadcast.
A viewer tunes his receiver 15-18 to one of the channels to
10 receive data from the transmitter 11-13 using that channel.

   The transmitters 11-13 broadcast data in a digital
coded format. The broadcast data is received and processed
by the receivers 15-18. The processing includes decoding the
data and presenting the decoded data for audio listening or
15 video viewing. Each receiver 15-18 can process several
content formats of broadcast data.

   The data of each broadcast belongs to one content
format, but the broadcasts can have any format. The content
formats may conform to standards and may contain additional
20 features specific to particular content providers. The
standards include the MPEG-2 standard, published in ISO/IEC
directives 13818-1 to 13818-3, approved Nov. 1994; the
standard proposed in ATVEF comment Draft Specification
version 1.1, published by the Advanced TV Enhancement Forum

- 4 -

in July 1998; or another standard for coding video or audio

data. The features specific to particular providers are

enhancements to standard formats, e.g., Disney ATVEF format.

The enhancements enable individual content providers to

5 exercise control over processing performed by the receivers

15-18 as described below.

FIG. 2 shows the receiver 15 of FIG. 1 embodied in a

personal computer 15'. The personal computer 15' has a

microprocessor 21 that can use several viewer applications

10 23-25 to process broadcast data 21 received from network

interface 22. The viewer applications 23-25 are stored in a

writable data storage device 26, e.g., a hard disk or random

access memory (RAM). The viewer applications 23-25 enable

the microprocessor 21 to decode the broadcast data received

15 from the interface 22 and to present the decoded data on

listening and visual viewing devices 29, 30.

The microprocessor 21 executes a control application

19 that selects an appropriate viewer application 23-25 to

process data from each broadcast. The control application 19

20 uses a scheduling table 31 and a viewer application selection

table 32 to select one of the viewer applications 23-25 for

processing data from each broadcast. The scheduling and

viewer application selection tables 31, 32 are also stored in

the data storage device 26 and can be updated by the microprocessor 21.

A user can make new viewer applications 23-25 available to the microprocessor 21. To add a new viewer

5 application 23-25, the user stores the new application 23-25 to the data storage device 26 and adds an entry for the new application 23-25 in a viewing application selection table 32. Each entry includes a number of parameters for identifying broadcast data that can be processed with the new

10 viewer application 23-25. For example, the parameters may include a broadcast channel, content provider, and/or content format.

A content provider may make new viewer applications available to users, e.g., to support new features of content

15 formats being produced by the provider. The new viewer applications may be distributed on magnetic or optical disks 27 in a form readable by a disk reader 28. The new viewer applications may also be distributed through an Internet site where a user can download the applications or broadcast over

20 a satellite, ATSC, or cable network.

FIG. 3 is a flow chart for a method 40 by which a receiver, e.g., a receiver 15-18 of FIGs. 1-2, processes data broadcast by a transmitter, e.g., a transmitter 11-13. To start processing, a user tunes his or her receiver to a

channel on which a transmitter broadcasts (step 41). In

response to the selection, the receiver receives data

broadcast on the selected channel (step 42). In response to

receiving data from the selected channel, receiver looks up

5   schedule information with relevant characteristics for

identifying the viewer application 23-25 to process the

scheduled data broadcast (step 44). These characteristics

may include the content provider and content format as shown

in exemplary scheduling table 31. The characteristics may

10   also include information on viewer ages, e.g., to stop

children from seeing portions of some broadcasts. The look

up includes comparing the actual broadcast time and channel

with entries of the scheduling table 31, which are indexed by

channel and time. The look up dynamically associates

15   relevant characteristics, e.g. the individual content

provider and content format, with each broadcast.

FIG. 4 shows a portion of one embodiment of the

scheduling table 31 of FIG. 2. The scheduling table 31 has

entries 32-35, which are indexed by broadcast time interval

20   and channel in columns A and B, respectively. The entries 32-

35 provide information for identifying one or more viewer

applications 23-25 for processing a scheduled broadcast. In

the exemplary table 31, the information includes an identity

of a content provider and a content format in columns C and D

- 7 -

for each broadcast. The content provider is the entity that created the broadcast data. Content providers include organizations, such as ABC, NBC, CBS, and Disney that produce products for broadcast by different transmitters. Content

5 providers may also include single transmitters, e.g., one of the transmitters 11-13, which broadcast data in special local formats.

Referring again to FIG. 3, information from the scheduling table 31 enables selections of viewer applications

10 23-25 adapted to processing the scheduled broadcast data. The receiver selects a viewer application 23-25 by using the information looked up in the scheduling table 31 as an index for finding entries 51-55 in the viewer application selection table 32 (step 46). The entries 51-55 list the viewer

15 applications 23-25 that are presently available to the receiver.

Each entry of the scheduling table 31 identifies one or more entries for viewer applications 23-25 in the viewer application selection table 32. Each identified viewer

20 application 23-25 can process the broadcast data associated with the entry in the scheduling table 31. The receiver 15′ selects a best entry from among the identified entries as described below. The receiver 15′ decodes and displays the

data using the viewer application 23-25 associated with the best entry (step 48).

FIG. 5 shows a portion of one embodiment of the viewer application selection table 32 of FIG. 2. The viewer

5 application selection table 32 has entries 51-55, which are indexed by information relevant to identifying a viewer application 23-25. Here, the data includes a broadcast channel, a content provider, and a content format in columns E, F, and G, respectively. Each entry 51-55 assigns one

10 viewer application 23-25, in column H, to use to process broadcast data described by the information in columns E, F, and G, i.e., scheduling information.

The viewer application selection table 32 of FIG. 5 is an example of one such table. Other embodiments may

15 employ viewer application selection tables 32 having other types of attribute value pairs in columns E, F, G, H.

Several entries 51-55 of the viewer application selection table may match information from one entry 32-35 of the scheduling table 31. For example, the entry 33 of the

20 scheduling table 31 has broadcast channel 2, provider ABC, and format ATVEF. These broadcast parameters match index fields of columns E, F, and G, for the entries 52-54 of the viewer application selection table 32. If multiple matches occur, the receiver 15' selects the entry that best matches

the scheduling information and uses the viewer application

23-25 associated with that entry to process the broadcast

data.

In one embodiment, the best matching entry has more

5 non-blank index columns than other matching entries of the

viewer application selection table 32. If no matches occur

with all non-blank entries, the receiver 15' looks for a

match with entries having one blank field. The search

continues to less specific entries if matches are still not

10 found, i.e., two blank fields, etc. In the above example,

the entry 54 is the best match, because this entry 54 has two

non-blank index columns F, G whereas the entries 52-53 only

have one non-blank column each, i.e., columns F or G.

Some receivers assign weights to the columns E-G for

15 use in determining which entry 51-55 is the best match. For

example, the weights may be 1, 2, and 3 for columns E, F, and

G, respectively. Then, an NBC broadcast of ATVEF data on

channel 8 matches both entries 52 and 55 in the viewer

application selection table 32 shown in FIG. 5. But, the

20 receiver selects the Intel ATVEF viewer application, because

the weight of the column G is higher than that of column E,

i.e., the entry 52 is the best match.

The viewer application selection table 32 provides

multiple matches, because the receivers 15-18 of FIG. 1 have

default applications among the viewer applications 23-25.

The default applications can process many content formats.

More specific matches provide viewer applications 23-25 that

support additional features in broadcast data. For example,

5 content provider ABC may incorporate special interactive

features into its ATVEF content. Those features are

presented to viewer if the receiver 15' processes the ABC

broadcast data with a Disney General Viewer of entry 54,

i.e., a specific match. If the receiver 15' does not have

10 the Disney general viewer, the receiver 15' processes ABC

ATVEF broadcasts with the default Intel ATVEF viewer, i.e.,

associated with entry 52. The default viewer may not support

the special interactive features incorporated by ABC.

FIG. 6 is a flow chart illustrating a method 60 used

15 by a transmitter, e.g., a transmitter 11-13 of FIG. 1, to

broadcast data. The transmitter sends a scheduling message

to the receivers, e.g., the receivers 15-18 of FIG. 1 (step

62). The scheduling message provides scheduling information

for one or more broadcasts, i.e., one or more entries 33-35

20 in the scheduling table 31 shown in FIG. 4. The scheduling

information may include time interval, channel, content

provider, and/or content format.

In response to receiving a scheduling message, a

receiver updates its scheduling table, e.g., the table 31 of

- 11 -

FIG. 2 for the receiver 15. The receiver writes a new entry to its scheduling table for each new data broadcast announced by a received scheduling message.

In the network 10, the scheduling messages may also
5 be sent over the same medium 20 of FIG. 1 that transports data for viewing or over a separate network. The separate network may be the Internet or a service information channel reserved for sending scheduling messages from the transmitters 11-13 to the receivers 15-18.

10 The transmitter broadcasts the scheduled data over the channel at the time period announced in the previous scheduling message (step 64). The scheduling messages are sent sufficiently ahead of data broadcasts to ensure that receivers can update their scheduling tables 31 prior to the
15 broadcasts.

Other embodiments are within the scope of the following claims.

What is claimed is:

- 12 -

1.   A method of broadcasting data, comprising:

sending to a receiver scheduling information that includes a scheduled time and identifies one or more viewer applications capable of processing a broadcast of data at the

5   scheduled time; and

broadcasting the data at the scheduled time.

2.   The method of claim 1, wherein the information includes a content format of the broadcast of data.

10

3.   The method of claim 1, wherein the sent information identifies one of a viewer age and a content provider for the data.

15   4.   The method of claim 3, wherein the sent information identifies a channel for broadcasting the data; and

the broadcast transmits the data in the identified channel.

20

5.   The method of claim 4, wherein the identified channel comprises one of a cable channel, a wireless channel, and a multicast group address.

6.   The method of claim 2, wherein the viewer applications decode broadcasted data.

7.   The method of claim 1, wherein the broadcasting

5 starts at a predetermined time after the sending of the information.

8.   The method of claim 2, wherein the content format is an ATVEF format.

10

9.   The method of claim 1, further comprising:
       sending second information about a second scheduled time and content format for a broadcast of new data, the second content format being indicative of a new viewer

15 application for processing the new data; and
       then, broadcasting the new data during the second scheduled time.

10. A method of processing data, comprising:

20   receiving scheduling information providing broadcast times for data broadcasts and information to identify one or more viewer applications to process the data broadcasts;
       receiving data from one of the broadcasts at the scheduled broadcast time; and

- 14 -

processing the received data with a viewer
application responsive to the scheduling information.

11.   The method of claim 10, wherein the scheduling
5 information identifies channels scheduled to broadcast the
data.

12.   The method of claim 10, wherein the scheduling
information associated with a portion of the broadcasts
10 identifies one of content formats, viewer ages, and content
providers of the associated data.

13.   The method of claim 10, wherein the processing
comprises:
15   decoding the received data.

14.   A method of processing data, comprising:
        receiving scheduling information that provides
broadcast times for data broadcasts and information for
20 identifying viewer applications for processing the
broadcasts; and
        writing the scheduling information to a scheduling
table having entries indexed by scheduled broadcast times and
channels.

15. The method of claim 14, further comprising:

selecting a viewer application to process received data based on information in the scheduling table.

5   16. A method of processing data, comprising:

receiving data from a broadcast at a scheduled broadcast time; and

selecting a viewer application from a table of available viewer applications to process the data; and

10   processing the received data with the selected viewer application.

17. The method of claim 16, further comprising:

looking up format information on the received data in

15 a scheduling table; and

wherein the selecting uses the looked up information to select a viewer application.

18. A system for receiving data broadcasts,

20 comprising:

an interface to receive broadcasts of data;

a data storage device storing viewer applications to decode the received data; and

a processor coupled to the data storage device, the

processor to select and execute ones of the viewer

applications based on scheduling information for the

broadcasts.

5

19.   The system of claim 18, wherein the data storage

device further stores an executable control application for

updating a scheduling table in response to receiving new

scheduling information for a broadcast of data.

10

20.   The system of claim 19, wherein the control

application selects the ones of the viewer applications to

decode data based on information from the scheduling table.

15   21.   The system of claim 19, wherein the control

application selects the ones of the viewer applications based

on availability data for the viewer applications stored in a

viewer application selection table.

20   22.   A data storage device encoding computer

executable instructions for a method of broadcasting data,

the instructions to cause the computer to:

send information to a receiver about a scheduled time

and content format for a broadcast of data, the content

format being indicative of one or more viewer applications for processing the data; and

    broadcast the data at the scheduled time.

5   23. The device of claim 22, wherein the information identifies one of a content provider, a viewer age, and a scheduled broadcast channel for the data.

       24. The device of claim 22, wherein the instructions 10 cause the computer to broadcast the data at a predetermined time after the sending of the information.

       25. The device of claim 22, the instructions further causing the computer to:

15   broadcast second information about a second scheduled time and content format for a new broadcast of new data, the second content format being indicative of another viewer application to process the new data; and

    then, broadcast the new data at the second scheduled 20 time.

       26. A data storage device storing executable instructions, the instructions to cause a computer to:

receive scheduling information for content formats

and broadcast times of broadcasts of data;

receive data from one of the broadcasts at the

scheduled broadcast time; and

5   process the received data with a viewer application

for processing a data format, the viewer application being

responsive to the scheduling information for the one of the

broadcasts.

10   27. The device of claim 26, wherein the scheduling

information identifies channels scheduled to broadcast the

data.

28. The device of claim 26, wherein the instructions

15 to process further causes the computer to:

decode the received data.

29. The device of claim 26, the instructions further

causing the computer to:

20   write the scheduling information to a scheduling

table having entries indexed by scheduled broadcast times;

and

wherein the instruction causing the computer to process causes the computer to select the viewer application based on data from the scheduling table.

5   30.   The device of claim 26, wherein the instruction causing the computer to process causes the computer to:

select the viewer application from a viewer application selection table listing available viewer applications.

BROADCASTING AND PROCESSING MULTIPLE DATA FORMATS

Abstract of the Disclosure

A method broadcasts data. The method includes sending to a receiver scheduling information that includes a

5 scheduled time and broadcasting data at the scheduled time. The scheduling information identifies one or more viewer applications capable of processing the broadcast data.

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FIG. 1

FIG. 2

15'

27

30

24

19

23

26

31   32   25

28

21

22

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29

```
  41 ⌇  Tune receiver to a channel

  42 ⌇  Receive   broadcast   data

  44 ⌇  Check  scheduling table
         to determine characteristics relevant to
         processing the broadcast

  46 ⌇  Select  an  available  viewer
         application using information in
         scheduling table

  48 ⌇  Decode and display the
         received data with selected
         viewer application
```
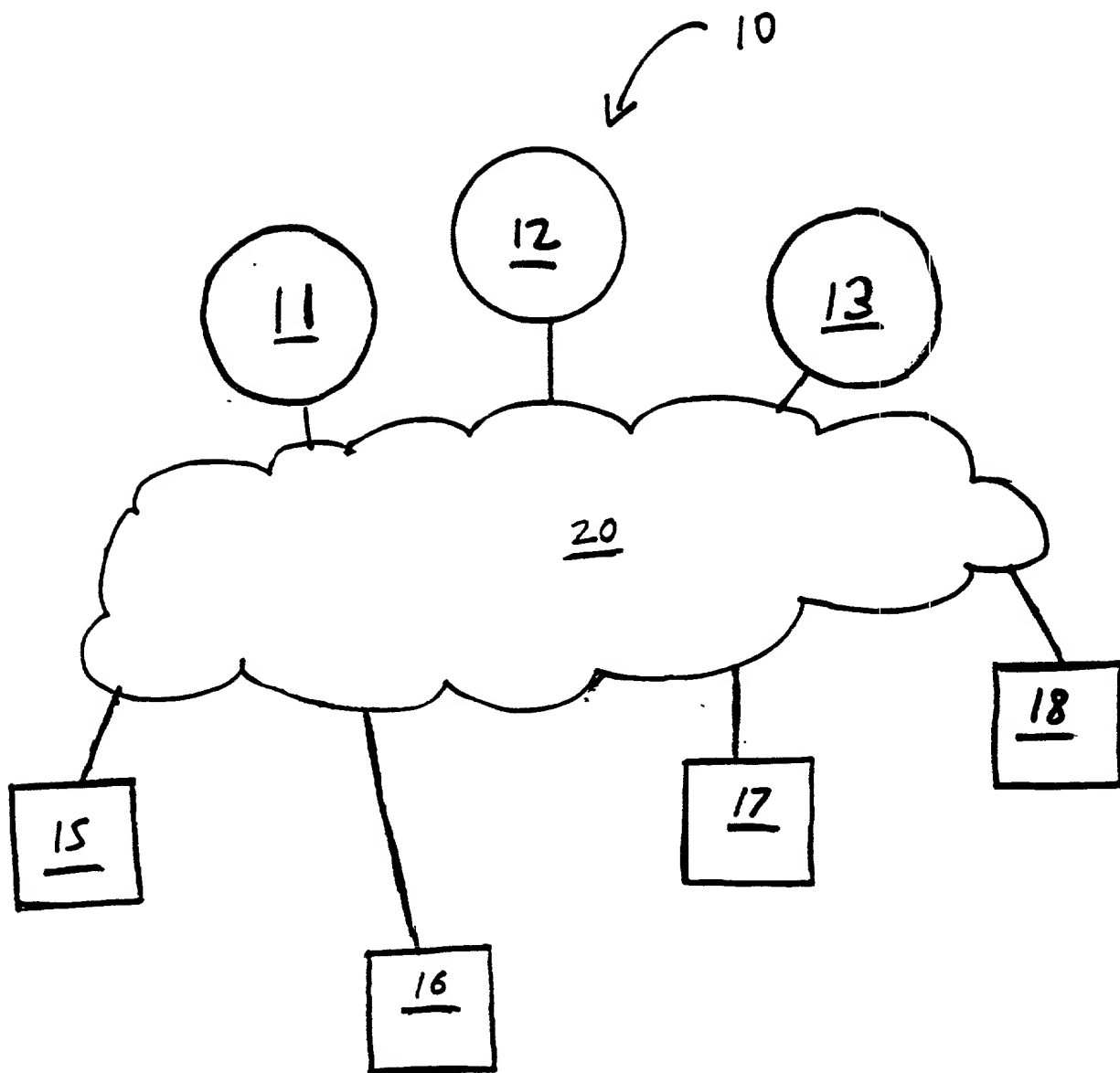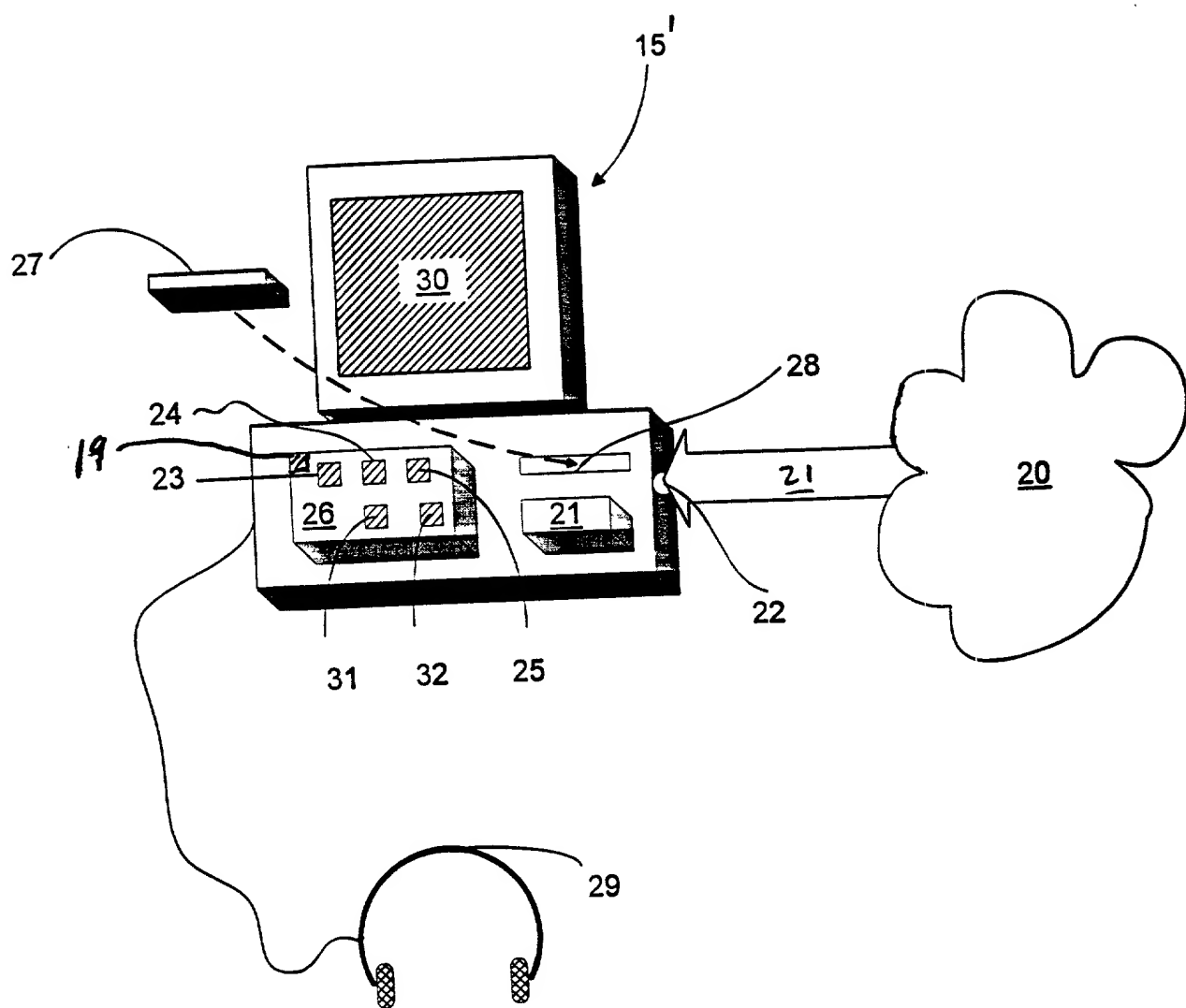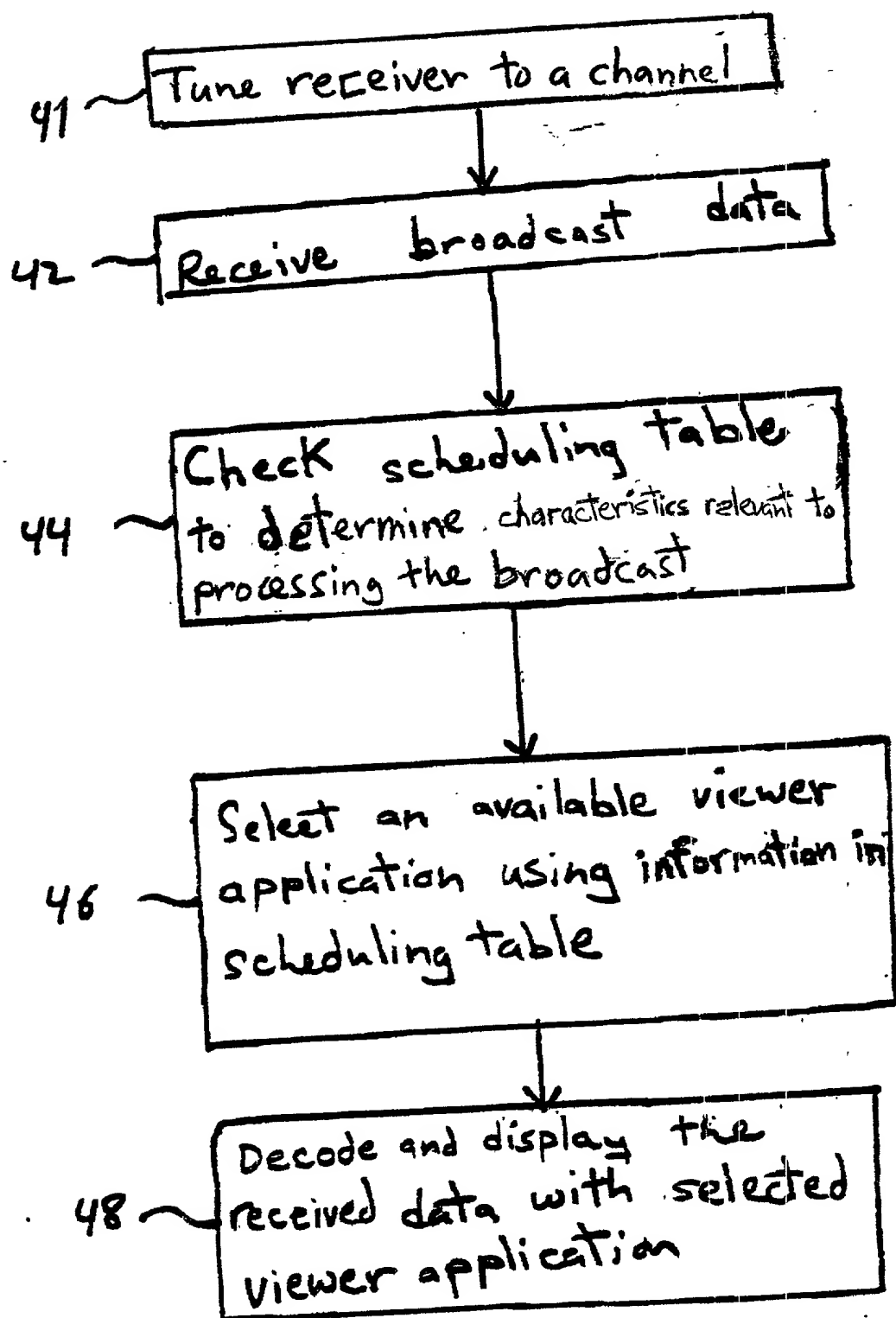
↖ 40

FIG. 3

FIG.4

31

Start time	Stop time	Channel	Provider	Format
8:00	8:30	1	ABC	MPEG2
8:00	8:30	2	ABC	ATVEP
8:00	9:00	3	ContentCo	ContCo
8:00	9:00	4	NBC	ATVEP

A   B   C   D

32
33
34
35

FIG. 5

Channel	Content Provider	Content Format	Viewer Application	
		MPEG-2	Generic MPEG2 Viewer	S1
	ABC	ATVEF	Intel ATVEF Viewer	S2
	ABC		Disney General Viewer	S3
		ATVEF	Disney General Viewer	S4
8			NBC Viewer	S5

32

↑ E   ↑ F   ↑ G   ↑ H

```
┌─────────────────────────────┐
│ Broadcast scheduling        │╲___ 62
│ message to receivers        │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│ Broadcast the sched-        │
│ uled data at the            │╲___ 64
│ scheduled time and on       │
│ the scheduled channel       │
└─────────────────────────────┘

         ↗
       60

                    FIG. 6
```

09/29/99   08:39   ☎509 640 6133   MSTG – INTEL   →→→ F&R PC ...   .

09/27/99 MON 11:47 FAX 6175428906 '   '   F&R·PC BOSTON   ☑002
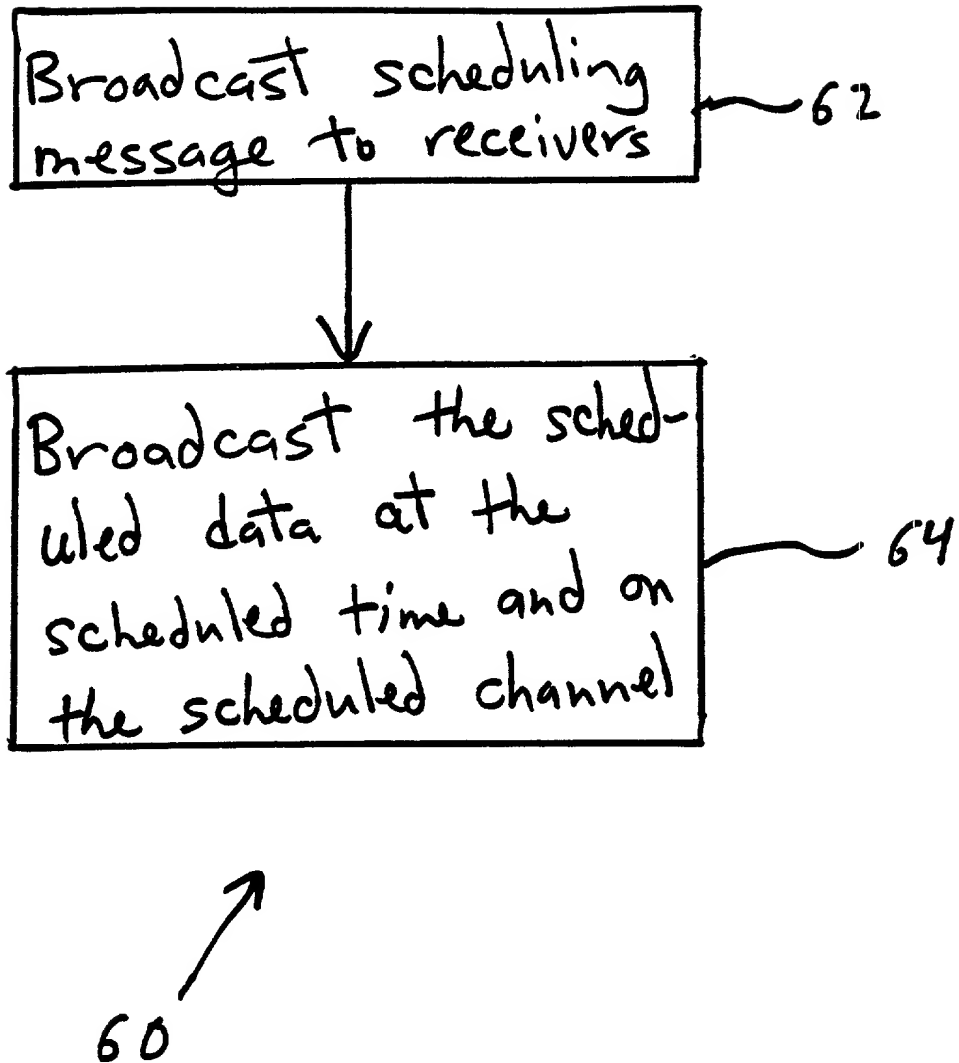
<div align="right">

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</div>

COMBINED DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled <u>BROADCASING AND PROCESSING MULTIPLE DATA FORMATS</u>, the specification of which

    ■ is attached hereto.
    ☐ was filed on _____ as Application Serial No. _____ _____
    and was amended on _____.
    ☐ was described and claimed in PCT International Application No. _____ _____
    filed on _____ and as amended under PCT Article 19 on _____.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose all information I know to be material to patentability in accordance with Title 37, Code of Federal Regulations, §1.56.

I hereby claim the benefit under Title 35, United States Code, §119(e)(1) of any United States provisional application (s) listed below:

U.S. SERIAL NO.   FILING DATE   STATUS
                                        _ Pending __Issued __Abandoned

I hereby appoint the following attorneys and/or agents to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith: Scott C. Harris, Reg. No. 32,030; William J. Egan, III, Reg. No. 28,411; David L. Feigenbaum, Reg. No. 30,378; John F. Land Reg. No. 29,554; Ralph A. Mittelberger, Reg. No. 33,195; Hans R. Troesch, Reg. No. 36,950; John R. Wetherell, Jr., Reg. No. 31,678; and Bing Ai, Reg. No. 43,312 of Fish & Richardson, P.C.

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Address all correspondence to <u>Scott C. Harris</u>, Fish & Richardson P.C., 225 Franklin Street , Boston, MA 02110-2804.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patents issued thereon.

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Revised August 24, 1994 (39]DECL.MRC)

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